

SETEC MODEL BCE4 & BCE5 USER'S MANUAL



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Manufactured by:

**SETEC Pty Ltd
19 Henderson Road
Knoxfield 3180
AUSTRALIA**

Phone: +61 3 9763 0962

Fax: +61 3 9763 8789

Email: sales@setec.com.au

WARNING:

This product Contains Hazardous voltages which can cause death. It should only be serviced by properly qualified personnel.

The product contains no user serviceable parts.

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INTRODUCTION

The SETEC models BCE4 and BCE5 (battery charger/eliminator) provide a power output of 140 watt at 13.6 and 27.2V respectively. The nominal input mains may be 200V to 240V and 50Hz or 60Hz (a 100 to 120V version is available, consult the factory for details).

The BCE4 and BCE5 have been designed specifically for telecommunications applications demanding high reliability, low noise, fully automatic battery backup, battery protection and full protection of the output. Many other applications will be able to take advantage of these features. Features include

- Light compact design
- High Efficiency
- Battery over discharge protection with automatic reset
- High reliability with conservative thermal design allowing continuous full load operation with convection cooling
- Alarm for low mains and reverse battery connection
- User accessible battery fuse
- User accessible output voltage adjustment
- Low noise output, ideal for telecommunications applications
- 3 modes of operation
- Convenient output connector
- Flexible mounting options
- Full protection for the power supply, load and battery
- Local technical support

OPERATION

Safety

Correct installation is the most critical factor in ensuring the safe use of the power supply. If every consideration in the **Installation** section of this manual has been satisfied the power supply will be safe to operate.

Operating Modes

The BCE4 and BCE5 have three main operating modes:

- As a battery eliminator it may be used to power equipment requiring 12V –14V at 10Amps. (24 –28V at 5Amps for BCE5). It is fully protected against overload and short circuit as well as incorporating over voltage protection.
- As a lead acid battery charger it will provide safe and convenient method to restore discharged batteries. Fully charged batteries can be left connected to the unit indefinitely with no adverse effects on their lifetime.
- The full features of the unit are realised when both a battery and a load are connected so that it operates as a power supply with power fail protection. Under normal conditions an internal switch connects the battery in parallel with the load. The average load must be less than the capability of the power supply to ensure there is a remainder available to float charge the battery.

When a mains failure occurs, the power supply no longer provides power. The battery now supports the load without interruption of the load. Restoration of the mains restarts the power supply which will resume support of the load and charging of the battery.

During extended mains failures the unit disconnects the battery before it becomes excessively discharged. The battery is automatically reconnected when the mains recovers. This feature contributes to long battery lifetime and allows unattended operation of a system.

Protection

The power supply incorporates the following protection features

- Reverse polarity connection of the battery will not cause damage to the power supply or the battery and the output load will remain unaffected.
- Battery fusing is provided in series with battery connection to protect the load and power supply when it is powered from the battery.

- Accurate current limit protection is provided for both load and battery. Automatic recovery from short circuit is provided with no current tailing in short circuit operation.
- Over voltage protection provides shutdown of power supply.
- Inrush Surge limiting at turn on.

Battery LVD Operation

A low voltage disconnect (LVD) is provided to prevent deep discharge of the battery.

When the mains has failed and the battery is supporting the load the battery must be disconnected if its voltage falls below $10.2V \pm 0.2V$ ($20.5V \pm 0.6V$ for BCE5) for longer than approximately 800mS.

The battery will reconnect in such a case when either;

1. The mains has recovered and the battery voltage is $> 9.5V$ or;
2. The battery voltage has recovered to greater than $11.9V \pm 0.3V$ ($23.5V \pm 0.7V$ for BCE5) for longer than approximately 2 seconds.

The BATTERY output has protection incorporated against a reversed battery connection. A reversed battery is left disconnected so that the LOAD output can still run the load from mains power.

The quiescent current drain on the battery when the main has failed is less than 30mA.

Indicators

A green LED (located next to the output connector) is illuminated during normal operation. An alarm condition extinguishes the LED.

Alarm

A green LED and a pair of normally closed, floating relay are provided to indicate alarm conditions. The LED is illuminated and the alarm relay contacts are open during normal operation. An alarm condition extinguishes the LED and closes the relay contacts. Alarm conditions are defined as any one or more of the following events:

The mains fails, or drops to below nominal input.

The battery has been connected backwards.

Output Voltage Adjustment

The output voltage is adjustable through the side of the power supply. Use a flat blade pot adjuster to adjust the output voltage. Clockwise rotation increases the output voltage.

When adjusting the output voltage, measure the voltage at the output connector with the battery disconnected. Failure to disconnect the battery can result in incorrect output voltage setting, and over charging of the battery may result.

The output voltage is factory set to 13.65V (27.20V for BCE5)

SPECIFICATION

The following table lists the specifications of the BCE4 and BCE5

Specification		
Input Voltage:	200-240V nominal, $\pm 10\%$, 50/60Hz. A 5 minute, +15% surge will not damage the power supply.	
Input Surge:	<40A	
Holdup Time:	>20mS, over the nominal input range	
	BCE4	BCE5
Output Voltage:	12.0 –14.0V Adjustable	24.0 – 28.0V Adjustable
Output Voltage factory set:	13.65V	27.20V
Output Ripple Voltage:	< 20mVp-p	< 20mVp-p
Output Current:	10.0A	5.0A
Over Voltage Protection:	< 16.0V	< 32.0V
Battery Disconnect	$10.2 \pm 0.2V$	$23.5 \pm 0.7V$
Battery Reconnect[□]	$11.9 \pm 0.3V$	$20.5 \pm 0.6V$
Battery Hysteresis	1.7V typ	3.0V typ
Battery Fuse	15A, 32Vdc	10A, 32Vdc
Load Regulation 1:	$\pm 2\%$ from set point taking into account all of line and load regulation and temperature coefficient when load powered by power supply	
Load Regulation 2:	+0 –2% of battery terminal voltage when load powered by battery.	
Alarm Relay Contact Rating	Normally closed contacts 60V @ 0.2A	
Operating Environment:	0 – 50°C Ambient. Convection cooled	
Efficiency:	90% typ	
Mechanical	See figures 1 - 6	
Weight	< 1Kg	
Compliance:	AS/NZS 60950-1 : 2003 AS/NZS CISPR22 Class A ACA EMC Compliance, C-Tick Mark	

[□] Battery is automatically connected if mains is present and the battery voltage is > 9.5V.

MECHANICAL

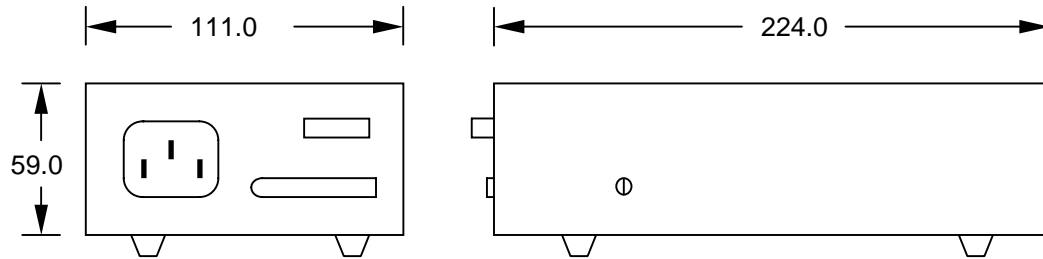


Figure 1 – Overall Dimensions

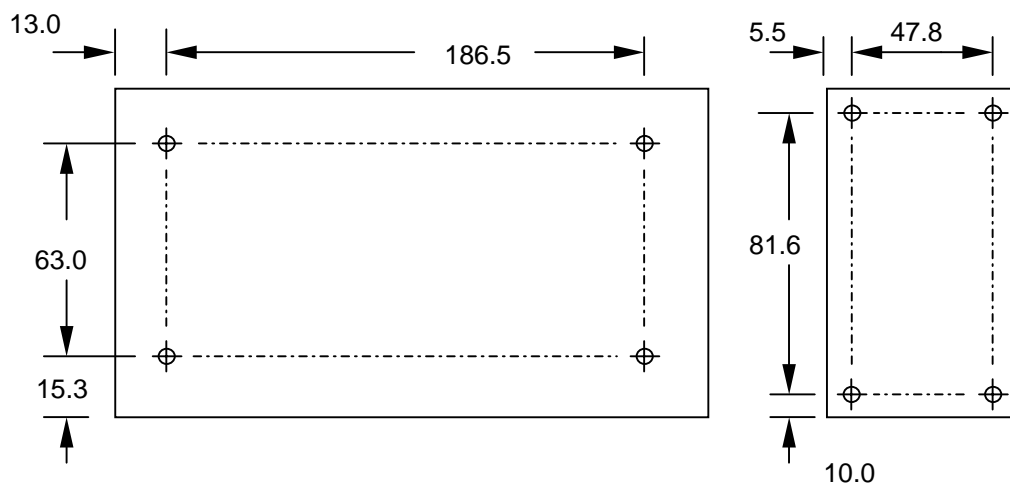


Figure 2 – Mounting Points

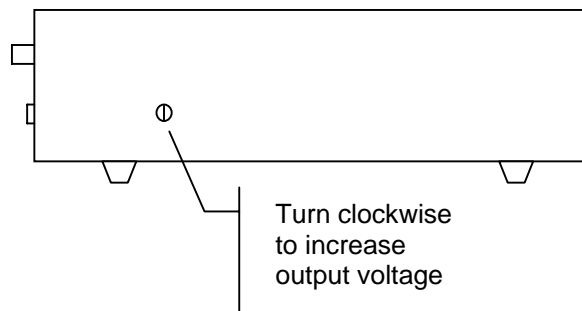


Figure 3 – Voltage Adjustment

MOUNTING

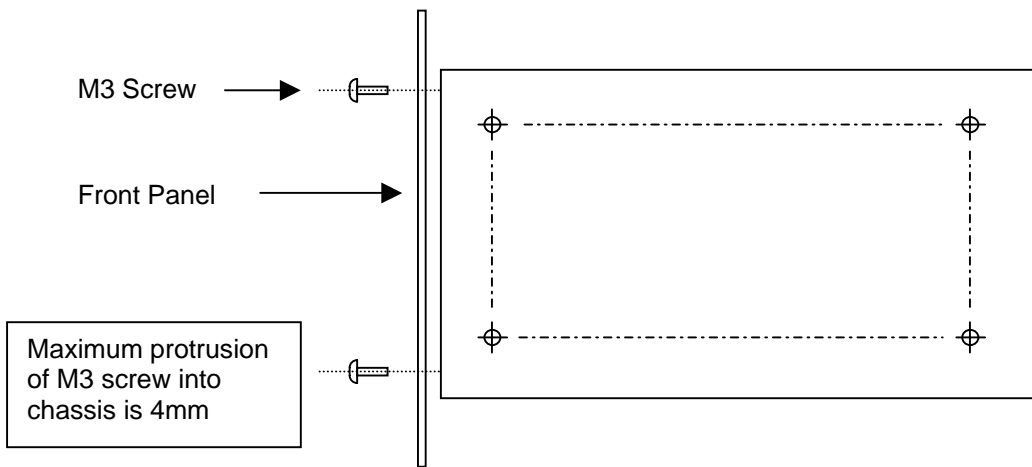


Figure 3 – Front Panel Mounting

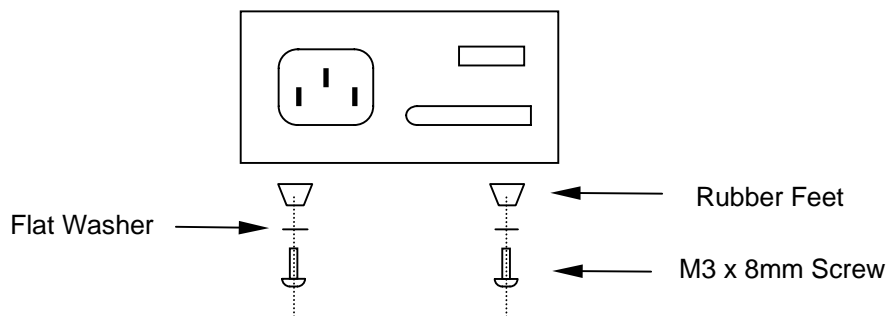


Figure 5 – Bench Mounting

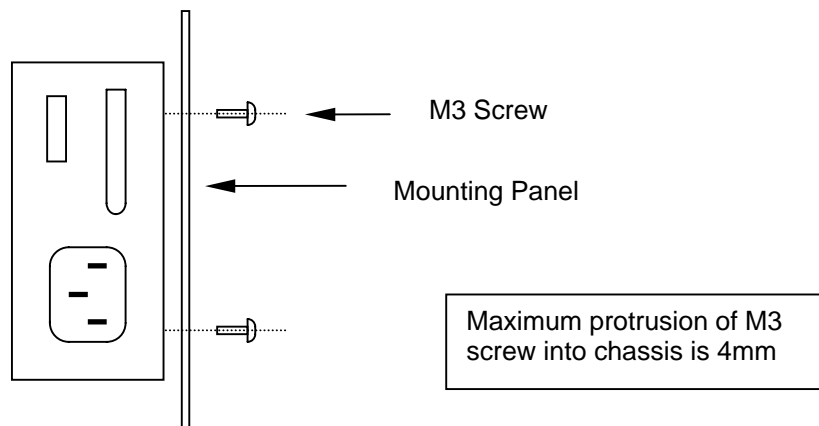


Figure 6 – Panel Mounting

INSTALLATION

Personnel

Installation should only be conducted and/or closely supervised by appropriately qualified personnel.

Mounting Options

The unit is supplied with 4 rubber feet for bench use. However, a number of mounting options have been provided to suit various installations. Mounting options have been provided at the front and the underneath of unit in the form of M3 x 0.5mm threads. The unit can be mounted horizontal or vertical to suit all types of installations. See figures 4 – 6.

The maximum thread length for these screws is 4mm from the outside edge of the power supply. **Hazardous Voltages** exist within the power supply so it is important that the screw lengths are adhered to.

Connectors

Input Mains: IEC320
DC Output: 6 Way female plugable type

Pinout for the DC output connector is as follows;

Pin	Function
1	0V
2	0V
3	Load
4	Battery
5	Alarm 1
6	Alarm 2

Mating Connectors: Phoenix: MSTB 2.5/6-ST
Weco 120-A-111/06
Camden CTB9200/6A

Hooking Up

The requirements for wiring a BCE4/BCE5 into a system are as follows:

LOAD, 0V

These 2 connections are the DC output of the power supply. These connections are to supply the load.

- These connections cannot be paralleled with output of duplicate power supply for increased current output.
- The load connection must not be directly connected to the battery or paralleled with the BATTERY connection. This will disable the battery low voltage disconnect circuit and defeat the internal battery fuse.

- Excessively long cable connections are not good practice. Try to keep these lines to a minimum to reduce system voltage drop.

BATTERY, 0V

These 2 connections are to be connected to the battery.

- Ensure that the battery is connected with the right polarity. Although reverse polarity will not harm the battery, power supply or the load, no backup of the load will occur during a power outage.
- Consult battery manufactures data before use with the power supply.
- Excessively long cable connections are not good practice. Try to keep these lines to a minimum to reduce system voltage drop.

RELAY

The 2 relay connections are the floating alarm relay contacts.

- Connect these pins to any circuit, which is required to be activated by an alarm condition. The 2 pins become shorted when an alarm condition occurs.
- These pins must not be connected to mains circuits or any other hazardous voltage circuits.

Cabling

AC Cabling: A cable size of 0.75mm² (18AWG) is recommended.

DC Cabling: A minimum cable size of 0.75mm² (18AWG) is recommended for BCE5.

A minimum cable size of 1.5mm² (16AWG) is recommended for BCE4

Note, maximum size of cable to output connector is 2.5 mm² or 12AWG
DC load cables must be sized to carry the maximum full load current and not exceed the system volt-drop requirements.

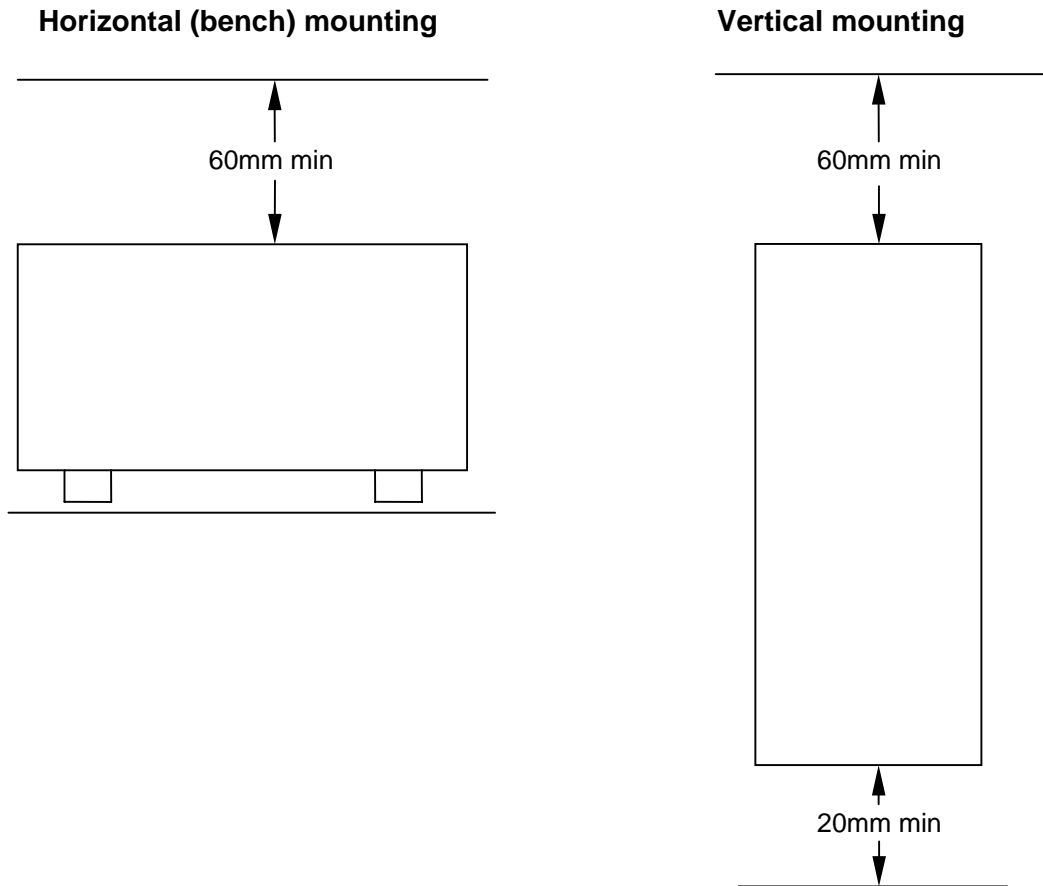
Battery Fuse

Only replace battery fuse with the following type,

	BCE4	BCE5
Battery Fuse:	Bussman ATC-15 Littelfuse 257 015	Bussman ATC-10 Littelfuse 257 010

Cooling

The BCE5 power supply has been design for convection cooling. It is, therefore, very important that its natural airflow is unimpeded. For maximum output power at maximum ambient temperature it is recommended that the following spaces above and below the power supply are provided.



Note: The maximum ambient operating temperature of the power supply is defined as the temperature of the air entering the bottom of the power supply. This may not be the same as the room temperature if the power supply is mounted above a heat source, or in a confined space.

If the objects above and below the power supply do not restrict the airflow, (i.e. perforated metal) then the distances shown above may be reduced. For more information contact the manufacturer.